

CLAIMS

What is claimed is:

1. A reinforcing bar splice comprising:

5 a jaw element section configured to engage ends of generally axially aligned reinforcing bars, wherein the jaw element section includes multiple jaw elements physically coupled together; and

tapered collars for engaging tapered outer surfaces of the jaw element sections to force the jaw elements inward to grip ends of the reinforcing bars.

10 2. The splice of claim 1, wherein the jaw element section is substantially fully radially external to the reinforcing bars, thus not having any part between the ends of the reinforcing bars.

15 3. The splice of claim 1, wherein the tapered collars axially engage the jaw element section to force the jaw elements inward.

4. The splice of claim 1, wherein the jaw elements each have teeth along an inner surface.

20 5. The splice of claim 4, wherein the teeth are substantially circumferentially oriented.

25 6. The splice of claim 4, wherein the teeth are substantially axially oriented ribs.

7. The splice of claim 4, wherein the teeth are asymmetric teeth, each having a slope on one face that is different than a slope on an opposite face.

30 8. The splice of claim 4, wherein the teeth are symmetric teeth, each having a slope on one face that is substantially the same as a slope on an opposite face.

9. The splice of claim 1, wherein the jaw element section includes a flexible web connected to the jaw elements.

10. The splice of claim 9, wherein the flexible web includes protrusions that
5 connect the jaw element to the web.

11. The splice of claim 9,
wherein the web is in contact with a middle portion of outer surfaces of the
jaw elements; and
10 wherein side portions of the outer surfaces are left uncovered by the web,
allowing the side portions to directly contact the collars.

12. The splice of claim 11, wherein the jaw elements have a rounded outer
surface shape in a circumferential direction.
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13. The splice of claim 11, wherein the jaw elements have an outer surface
shape with rounded corners, in a circumferential direction.

14. The splice of claim 9, wherein at least part of the web is interposed
20 between the jaw elements and the collars.

15. The splice of claim 14, wherein the web covers substantially all of outer
surfaces of the jaw elements.

25 16. The splice of claim 9, wherein the jaw element section wraps
substantially fully about the ends of the reinforcing bars.

17. The splice of claim 16, wherein the jaw element section includes at least
five jaw elements connected to the web.
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18. The splice of claim 1, wherein the splice includes at least two jaw
element sections.

19. The splice of claim 18, wherein the jaw element sections each have an extent of greater than 120 degrees and less than 180 degrees.

20. The splice of claim 18, wherein the jaw element sections each include
5 plural axially-oriented jaw elements joined together at one or more hinge points.

21. The splice of claim 20,
wherein the jaw element sections each include a wall, and teeth along an
inner surface of the wall; and
10 wherein the wall has one or more notches therein corresponding to respective
of the hinge points.

22. The splice of claim 21, wherein the teeth are substantially
circumferentially oriented.
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23. The splice of claim 22, wherein the teeth have one or more tooth notches
therein corresponding to respective of the hinge points.

24. The splice of claim 21, wherein the teeth are substantially axially oriented
20 ribs.

25. The splice of claim 20, wherein the jaw element sections include at least
three jaw elements.

25 26. The splice of claim 18, wherein each of the jaw element sections is a
multi-part jaw element section including:
a tapered shell having the tapered outer surfaces; and
the jaw elements radially inward of the tapered shell, and in contact with the
tapered shell, for contacting and gripping at least one of the reinforcing bars.

30 27. The splice of claim 26, wherein the jaw elements fit into corresponding
recesses of the tapered shell.

28. The splice of claim 26, wherein the jaw elements include jaw elements on respective of the ends of the tapered shell.

29. The splice of claim 28, wherein the shell includes multiple of the jaw
5 elements at each of the ends of the shell.

30. The splice of claim 26, wherein the jaw elements are parallelepiped-
shape jaw elements.

10 31. The splice of claim 1, wherein the tapered collars each include an inner
sleeve portion and an outer sleeve portion, and wherein the sleeve portions include
different materials.

32. The splice of claim 31, wherein the material of the outer sleeve portion
15 has a greater tensile strength than the material of the inner sleeve portion.

33. The splice of claim 32, wherein the material of the outer sleeve portion
includes carbon fibers.

20 34. The splice of claim 33, wherein the carbon fibers include wound carbon
thread.

35. The splice of claim 1, wherein the tapered collars include wound carbon
thread.

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36. The splice of claim 35, wherein the tapered collars further include a steel
inner sleeve portion between the carbon thread and the outer surfaces of the jaw
elements.

30 37. The splice of claim 1, wherein the tapered collars have an inner surface
coated with a lubricant.

38. The splice of claim 37, wherein the lubricant includes a synthetic polymer material.

39. The splice of claim 1, in combination with the reinforcing bars.

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40. A method of joining ends of substantially axially aligned reinforcing bars, the method comprising:

placing jaw elements having tapered outer surfaces over ends of the reinforcing bars; and

10 forcing the jaw elements inward to grip the ends of the reinforcing bars, wherein the forcing includes exerting an axial force on tapered lock collars placed on ends of the jaw elements;

wherein the forcing includes driving teeth of the jaw elements into protrusions on a surface the reinforcing bars, without encroaching upon an underlying core of
15 the reinforcing bars.

41. The method of claim 40, wherein the placing includes one or more jaw element sections, each of the jaw sections include multiple of the jaw elements coupled together.

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42. The method of claim 41, wherein the placing includes placing a pair of the jaw elements substantially diametrically opposed on opposite sides of the ends of the reinforcing bars.

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43. The method of claim 42, wherein the placing includes leaving circumferential gaps of at least about 40 degrees in extent between the jaw elements.

44. The method of claim 41, wherein the forcing includes moving jaw
30 elements of the jaw element sections relative to one another by flexing at hinge points of the jaw element sections.

45. The method of claim 40, wherein the teeth are circumferentially oriented.

46. The method of claim 40, wherein the teeth are longitudinally (axially) oriented.

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47. A jaw element section for engaging reinforcing bars comprising:

a wall; and

teeth attached to an inner surface of the wall;

wherein the wall has a tapered outer surface;

10 wherein the wall has wall notches therein that define hinge points or reduced thickness; and

wherein the jaw element section includes jaw elements hingedly coupled to one another at the hinge points.

15 48. The jaw element of claim 47, wherein the teeth are circumferentially oriented.

49. The jaw element of claim 48, wherein the teeth have tooth notches corresponding to the hinge points.

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50. The jaw element of claim 47, wherein the teeth are longitudinally (axially) oriented ribs.

51. The jaw element of claim 47, as part of a splice that includes at least one
25 other jaw element, and a pair of tapered collars that fit over and engage the jaw elements.

52. A jaw element section for splicing ends of reinforcing bars, comprising:
a flexible web; and

30 plural jaw elements coupled to the web;

wherein the jaw elements each include tapered outer surfaces and a toothed inner surface.

53. The jaw element section of claim 52, wherein the web is a plastic web.

54. The jaw element section of claim 52, wherein the web includes protrusions that connect the jaw elements to the web.

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55. The jaw element section of claim 52, in combination with a pair of collars having tapered inner surfaces for engaging the tapered outer surfaces of the jaw elements.